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colored figures, in criticizing which we said: "We can wish Mrs. Wright's book no better fortune than that in the future editions it is sure to reach, it may have illustrations in keeping with the exceptionally high character of the text"; and no better compliment can be paid to either than to add that this hope has been fully realized. Mr. Fuertes's drawings, which so vivify the pages of 'Citizen Bird,' are here reproduced for the most part as full-page plates, which in size are obviously more just to the originals than the smaller text figures of the work in which they first appeared.—F. M. C.

**Dixon's Migration of Birds.**<sup>1</sup>—The 'amended edition' of Mr. Dixon's book, 'The Migration of Birds,' is very different from the original, published in 1892 (*cf. Auk*, X, 1893, pp. 70-73). Many of the theories and statements then put forth with so much confidence are now discarded, the book having been not only, as claimed on the title page, "entirely rewritten," but rewritten from a wholly different standpoint. His views are perhaps still subject to change, as he says that in writing the present book he was compelled to modify his views as expressed in his recent work on 'The Migration of British Birds,' published in 1895, wherein he propounded "a hitherto undiscovered Law of Dispersal." This law he looks upon as his "first *original* attempt to solve the problem of bird migration." Although written with the same confidence in his own conclusions as was the first, the present is a vastly better work, both in matter and method, for he now deigns to give his readers references to some of his sources of information. He also displays much greater familiarity with the literature of the subject, and has evidently greatly profited by works that were quite unknown to him, although previously published, when his first book was written. We miss many of the ideas so strikingly Gätkean met with in the first edition, many of which are now not only discarded, but formally controverted at considerable length. Especially is this the case with Gätke's "assumption" that "young birds migrate absolutely before their parents" (p. 113), where several pages are devoted to a critical analysis of Gätke's evidence.

The author states in his preface: "In some respects the present volume may be regarded as an effort to stem the torrent of mystery which bids fair soon to overwhelm the subject of Migration; to explain its varied phenomena by an appeal to natural laws and to common sense; not by the invocation of esoteric influences and supernatural impulses." Again he says (p. 125): "The effort to increase the mystery of Migra-

<sup>1</sup> The | Migration of Birds: | an attempt to reduce Avian Season Flight to Law. | By | Charles Dixon. | — | Amended Edition. | Entirely rewritten in accordance with the Author's latest Discoveries and | Views respecting the Subject of Avine Dispersal. | — | London: Horace Cox, | Winsor House, Bream's Buildings, E. C. | — | 1897.—8vo, pp. xix + 426, with 2 maps.

tion seems little short of a fascination with some naturalists, and prominent amongst these, we deeply regret to say, must be included such a veteran and accomplished observer as Herr Gätke, whose anti-Darwinian and anti-evolutionistic views may very probably be responsible for the position which he has taken up with regard to this portion especially [of how birds find their way] of the phenomenon of avine season-flight." Consequently it is not surprising to find many pages devoted to an exposure of the fallacies contained in 'Heligoland,' and an attempt to counteract the undesirable effect of copying as "*ex cathedra*" these "wild speculations," and "startling estimates of the speed at which birds fly," into many popular works on the subject of migration. This lament is doubtless widely shared by thoughtful students of the subject.

Mr. Dixon here offers us, however, a new theory of the origin of migration in birds, all previous theories, in his opinion, proving untenable. The new hypothesis is founded on what he claims "to be a hitherto undiscovered law governing the geographical distribution of species," which he terms "the Law of Dispersal." This law is based on the following assumptions: (1) That there was formerly a vast extent of intertropical land, stretching continuously around the globe, in which life originated and from which life has spread in the direction of the poles. A former extensive antarctic continent, which some writers believe once existed, he considers as having no bearing on the question; from his point of view, the former great extension of land must have been equatorial. The very general belief in the comparative permanence of the principal oceans and land masses, held so firmly by nearly all geologists of high standing, he thinks is without foundation, and that this erroneous view is responsible for the mistaken opinions now so generally held on the subject of the origin and cause of migration. (2) He affirms that the Glacial Epoch could not have been the inducing cause of migration in the northern hemisphere; the belief that species began "to retreat or emigrate beyond the influence of the adverse conditions of existence, as the climate changed and became more severe" is absolutely opposed, he says, by all the facts; in other words, as he repeatedly affirms, an emigration southward to escape the adverse conditions of the advancing ice age, is a myth. There was no movement southward of any species; they were simply exterminated; "the only forms that survived this several times repeated glacial invasion were those whose pre-glacial breeding range extended beyond its influence." The current opinion "that species evacuated their northern homes as the glacial periods came on, and returned to them, more or less modified, as the climate ameliorated," is, in his opinion, "an entirely erroneous interpretation of facts." (3) Migration, he claims, is the corollary of emigration; both are due to an effort to increase the breeding range of the species, and the lines of migration are always along the old routes of the gradual range extension of the species. (4) Spring migration is due

entirely to the impulse to breed. (5) The true home of the species is its winter area, this being also its original centre of dispersal. (6) Autumn migration is thus a return to winter haunts or centres of dispersal, under what he terms a nostalgic impulse, or homesickness; scarcity of food, either present or prospective, decrease of temperature, or any other adverse conditions, have nothing whatever to do with the inception of this autumnal movement.

This is a brief outline of Mr. Dixon's premises and conclusions. An analysis of his evidence shows that they rest mainly on personal 'belief,' and novel assumptions unsupported by any considerable array of facts. He makes repeated reference to his study of "pre-glacial distribution," and to his "investigation of post-glacial emigration," as having convinced him respectively that a southern emigration, or a southern migration, "to escape adverse climatic conditions is a myth," and that "range extension trends in only two directions," namely, from the equator towards the poles. Unfortunately the evidence that has led to these convictions is not disclosed, at least in any formal way.

In discussing his 'law of dispersal,' he says it elucidates "almost innumerable facts of dispersal which have hitherto baffled all attempts to explain them." Among these is the absence of tropical forms in temperate latitudes, etc. It is obvious, however, that the influence of temperature in limiting the dispersal of species is a factor in the problem that has either never occurred to him, or else is one which he chooses to studiously ignore throughout his work.

It is, on the whole, perhaps hardly worth while to take Mr. Dixon seriously, inasmuch as he shows no great knowledge, in the first place, of the elements of the problem he proceeds to treat so confidently, which is no less than the origin of life in general and an explanation of its present geographical distribution; yet, so far as his book shows, he has never thought of it in that light. To him it is simply the migration of birds, which involves incidentally questions of their geographical origin and distribution, although he may be supposed to refer to life in general, especially in speaking of his grand discovery of what he terms the "Law of Life's Dispersal." Birds of course are not to be treated as a group apart from the rest of the animal kingdom, but as subject to the same general laws of dispersal as other animals, and even plants. On this an appeal to the geological record is fatal to our author's grand conceptions, who, though referring often to his "preglacial investigations," gives no evidence of knowing anything of either geological or biological conditions prior to the Ice Period. He is thus free to construct, remove, or transpose continents and seas to suit his hypotheses of bird migration, as well as to assume breeding areas that do not exist, simply because there should be such breeding areas to render his theories of both migration and dispersal in any degree tenable.

It is therefore to be regretted that a work so full of information for the

general reader on the various phases of bird migration should be more or less vitiated throughout by the ill-devised theory which pervades and colors an otherwise praiseworthy book,—a work, in other respects, as regards its general character, far in advance of Mr. Dixon's previous one bearing the same title.—J. A. A.

**Marsh on the Affinities of *Hesperornis*.**<sup>1</sup>—Professor Marsh here reaffirms the correctness of his conclusion, published in 1880, that "the Struthious characters, seen in *Hesperornis*, should probably be regarded as evidence of real affinity, and in this case *Hesperornis* would be essentially a carnivorous, swimming Ostrich." Authors who had not seen the original specimens, says Prof. Marsh, "seem to have accepted without hesitation the striking adaptive characters of the posterior limbs as the key to real affinities," till soon "the Ratite affinities of *Hesperornis* were seldom alluded to in scientific literature." He has remained silent, "leaving to future discoveries the final decision of the question at issue." This decision, Prof. Marsh thinks, is now on record, Prof. Williston having discovered near the original type locality a remarkably perfect specimen of *Hesperornis*, with the feathers in place, showing that *Hesperornis* had "the typical plumage of an Ostrich." Reference to Prof. Williston's paper (*Kansas University Quarterly*, Vol. V, No. 1, July, 1896, pp. 53, 54, pl. ii) shows that there is still ground for a difference of opinion as to the Struthious character of the downy feathers found on the tarsus and head of Prof. Williston's specimen of *Hesperornis*.—J. A. A.

**Stone on the Genus *Sturnella*.**<sup>2</sup>—Mr. Stone's paper has relation mainly to the forms referred to *S. magna mexicana*, the Rio Grande Valley phase of which group Mr. Stone now separates as a new subspecies, under the name *S. m. hoopesi*. This form resembles *magna* in the coloration of the lower parts, it lacking the yellow on the malar region, while the upper plumage is lighter even than in *neglecta*, with the tail bars "more distinct than in any of the other races." True *S. m. mexicana* thus becomes restricted to southern Mexico and Central America, *S. m. hoopesi* taking its place in the A. O. U. Check-List. The Florida bird, which has sometimes been referred to *mexicana*, Mr. Stone finds is not separable from Louisiana examples, and that these latter differ but little from specimens from southern Indiana and southern Illinois. He considers it therefore inadvisable to separate this Gulf coast phase from *magna*.—J. A. A.

<sup>1</sup> The Affinities of *Hesperornis*. By O. C. Marsh. *American Journal of Science*, III, April, 1897, pp. 347, 348.

<sup>2</sup> The Genus *Sturnella*. By Witmer Stone. *Proc. Acad. Nat. Sci. Phila.*, 1897, pp. 146-152.